

Claims

1. A fingerprint sensor arrangement comprising at least one driver electrode and at least one sensor electrode for a capacitive measurement, and an integrated signal
5 processing circuit for the measurement of signals from the electrodes, and interconnecting wiring between the electrodes and the integrated circuit, **characterized** in that the at least one driver electrode, the at least one sensor electrode, said signal integrated circuit and said interconnecting wiring are embedded within an integrated module.
- 10 2. An arrangement according to claim 1, **characterized** in that said electrode and said integrated circuit are coupled with a substrate, the substrate comprising said wiring between the electrodes and the integrated circuit.
- 15 3. An arrangement according to claim 2, **characterized** in that the substrate comprises the at least one driver electrode, said at least one sensor electrode, or both.
- 20 4. An arrangement according to claim 2, **characterized** in that said substrate is a flexible film.
5. An arrangement according to claim 1, **characterized** in that it comprises a substrate comprising wiring for an external connection to the integrated circuit.
- 25 6. An arrangement according to claim 5, **characterized** in that it comprises wire bonding between the integrated circuit and wiring of the substrate.
7. An arrangement according to claim 5, **characterized** in that it comprises metallization between the integrated circuit and wiring of the substrate.
- 30 8. An arrangement according to claim 5, **characterized** in that said substrate is flexible film.
9. An arrangement according to claim 1, **characterized** in that said
35 interconnecting wires are metallizations between polymer layers.

10. An arrangement according to claim 1, **characterized** in that said at least one driver electrode and/or said at least one sensor electrode is metallization between polymer layers.
- 5 11. An arrangement according to claim 1, **characterized** in that it comprises guard rings in the vicinity of the at least one driver electrode, in the vicinity of at least one sensor electrode, or both.
- 10 12. An arrangement according to claim 11, **characterized** in that said guard ring is metallization and the arrangement comprises an insulating polymer layer between the guard ring metallization and the sensor electrode.
- 15 13. An arrangement according to claim 1, **characterized** in that said integrated module is encapsulated with injection molded polymer.
14. An arrangement according to claim 1, **characterized** in that the surface of said sensor has a curved form in at least two dimensions.
- 20 15. An arrangement according to claim 14, **characterized** in that said form approximates the form of a finger.
16. An arrangement according to claim 1, **characterized** in that the arrangement comprises a bump for elevating the electrodes.
- 25 17. An arrangement according to claim 16, **characterized** in that said bump is a layer of polymer.
18. An arrangement according to claim 1, **characterized** in that said sensor comprises one driver electrode and a row of sensing electrodes.
- 30 19. An arrangement according to claim 18, **characterized** in that said measurement circuit is adapted to measure successive signals while the finger moves in a perpendicular direction in relation to said row of sensing electrodes, for providing a two dimensional matrix of capacitive measurement results from the
- 35 finger.

20. An arrangement according to claim 1, **characterized** in that the arrangement further comprises a infrared light source, a infrared light detector and second measurement means for measuring absorption of infrared light from the finger.
- 5 21. An arrangement according to claim 1, **characterized** in that said arrangement further comprises a temperature sensor for measuring the temperature from the finger.
- 10 22. An arrangement according to claim 1, **characterized** in that said arrangement further comprises a humidity sensor for sensing humidity of the finger.
23. A mobile terminal, **characterized** in that it includes a fingerprint sensor arrangement according to claim 1.
- 15 24. A method for producing a fingerprint sensor, **characterized** in that the method comprises the following steps:
providing a signal processing integrated circuit,
providing at least one driver electrode,
providing at least one sensor electrode,
20 encapsulating said integrated circuit, said at least one driver electrode and said at least one sensing electrode into an integrated module.
- 25 25. A method according to claim 24, **characterized** in that said step of encapsulating comprises a step of encapsulating into polymer.
26. A method according to claim 24, **characterized** in that said step of providing said at least one driver electrode comprises a step of metallization.
- 30 27. A method according to claim 24, **characterized** in that said step of providing said at least one sensing electrode comprises a step of metallization.
28. A method according to claim 24, **characterized** in that the method comprises the step of providing at least one guard ring in the vicinity of at said least one sensor electrode.
- 35 29. A method according to claim 28, **characterized** in that the step of providing at least one guard ring comprises a step of metallization.

30. A method according to claim 28, **characterized** in that it comprises a step of providing an insulating polymer layer between said at least one guard ring and said at least one sensing electrode.
- 5 31. A method according to claim 24, **characterized** in that it comprises a step of providing a substrate and connecting said integrated circuit on said substrate before said encapsulating.
- 10 32. A method according to claim 31, **characterized** in that the method comprises a step of providing an aperture in said substrate for providing an electrical connection through the substrate.
- 15 33. A method according to claim 24, **characterized** in that the method comprises a step of providing an elevating bump between said substrate and the electrodes.
34. A method according to claim 33, **characterized** in that said bump is made of a layer of polymer.
- 20 35. A method according to claim 31, **characterized** in that said substrate is flexible and includes wiring.
- 25 36. A method according to claim 35, **characterized** in that an end of said flexible substrate is used for an electrically connecting external circuits to the fingerprint sensor.
- 30 37. A method according to claim 35, **characterized** in that wiring of said flexible substrate is used for providing said at least one sensing electrode, for providing said at least one driving electrode, or both.
38. A method according to claim 24, **characterized** in that said at least one sensing electrode, or said at least one driving electrode, or both are provided with metallization on the surface of the integrated circuit.
- 35 39. A method according to claim 31, **characterized** in that an electrical connection is provided by wire bonding between the integrated circuit and wiring of the substrate.

40. A method according to claim 31, **characterized** in that an electrical connection is provided by metallization between the integrated circuit and wiring of the substrate.
- 5
41. A method according to claim 24, **characterized** in that conductive bumps are connected with a flip chip process to a metallization of a substrate or the integrated circuit for providing external electrical connections to the integrated circuit.
- 10
42. A method according to claim 24, **characterized** in that a polymer layer is provided by injection molding using micro replicated mold.
43. A method according to claim 24, **characterized** in that the process comprises the steps of providing polymer layers and at least one metallization layer one upon
- 15 the other.
44. A method according to claim 24, **characterized** in that the fingerprint sensor is embedded into an equipment cover.